

As to figuring fragments of bones, I did all that my limited knowledge of mammalian osteology would permit in identifying the common mammals, and in giving a list of them as other writers have done in similar investigations. Possibly Mr. Dickins may here find a fruitful field for investigation, in which he may establish the recent nature of the deposits. I cheerfully proffer to him a large accumulation of fragments of bones in Tokio waiting to be put together!

His comparison of the Omori pottery with Banko will greatly amuse any one at all familiar with Banko, or its associate forms, Hansuki, Otagukuan, Miki, Bashodo, Tokonabe, or their imitators either ancient or modern.

His review being thus occupied with a series of misstatements, he naturally finds no room to discuss my evidences of cannibalism or platycnemic tibiae.

Finally, his ungenerous complaint of my well-merited compliment to the Japanese printers and binders who made the pamphlet, illustrates a lamentable but too common trait of the ordinary Briton in Japan, namely, that which manifests itself in a childish delight at the failures of the Japanese and in sneers at their successes.

EDWARD S. MORSE

Salem, Mass., U.S., March 25

Wallace's "Australasia"

MR. EVERETT appears surprised that he should have to make any corrections in my brief account, in the above-named work, of Borneo and the Philippines, countries in which he has resided and travelled for many years. My surprise is that he has not been able to make far larger and more important corrections. Residents abroad soon acquire a mass of local information, and naturally think that what has been long familiar to themselves must be well known in England, forgetting that books on such subjects are written at long intervals, and when written rarely contain all the information up to date. I am exceedingly thankful for any additional facts or corrections for a new edition of the book, but I do not acknowledge to "errors" in the omission of facts which were not to be found in any books in English libraries at the time I wrote. I will make a few observations on the chief points in Mr. Everett's letter.

1. As to the accuracy of the maps I am not responsible, as Mr. Everett might well have supposed in a series of works issued in Mr. Stanford's name. The fact that Palawan and Mindanao are now as completely Spanish possessions as Luzon, is, I think, quite new to British readers.

2. I certainly omitted the mention of *Tupaias* among the Philippine mammals by an oversight. In giving a general sketch of the peculiarities of Philippine zoology I should, however, again omit Palawan from consideration, as that island is zoologically more nearly connected with Borneo. In the absence of all other information about Palawan, I took my account chiefly from Crawfurd's "Descriptive Dictionary." He mentions the frizzled hair of the natives, and deer among the wild animals; and as deer abound both in Borneo and the Philippines, their absence in Palawan requires proof rather than their presence.

3. The detailed range of the rhinoceros and wild cattle in Borneo has not yet, that I am aware, been given by any writer. My general statements, though imperfect, do not seem very far from the truth.

4. As to what Mr. Everett styles my "extraordinary statement" about the "Idaan" and "Milanow" tribes, I founded it on Mr. Spencer St. John's book. He says (vol. i. p. 396) of the Idaan—"They were a dark, sharp-featured race, intelligent-looking, and appeared in features very much like the Land Dyaks of Sarawak." While of the Milanows he says (i. p. 46) "some are clothed like Mahomedans, others like Dyaks, to which race they undoubtedly belong." As the Milanows live at the mouths of rivers, while the Idaan live inland, I cannot see the "extraordinary" character of the statement that they "correspond" to the division of Land and Sea Dyaks usually made in the Sarawak territory. This does not imply that there are no differences of language, customs, &c., but rather that there are such differences; but if there are radical physical differences they were evidently not known to Mr. St. John, whose long residence in Borneo and great opportunities for acquiring information entitle him to be considered an authority.

It will be seen that Mr. Everett's new matter is very scanty, and I should not have thought it worth while to do anything more than make use of it, were not his letter written in a somewhat critical spirit, which I think he would not have adopted

had he known the great difficulty of obtaining accurate information on the innumerable subjects that have to be treated in a book of so wide a scope as "Australasia," and dealing with countries which have been as yet imperfectly described. Like some other critics, too, he forgets that general statements for popular information, which must be comprised within a few lines, cannot always be made strictly accurate without becoming vague, and thus ceasing to convey any definite ideas.

ALFRED R. WALLACE

The Comet 1861 I.

IN the course of some work on comets lately communicated to the Royal Society of Edinburgh, in which I show reasons for believing that a planet more distant from the sun than Neptune is at present in the position R.A. 11h. 40m., N.P.D. 85°, or thereabouts, I was led to the conclusion that the comet 1861 I., visible to the naked eye, should have been in perihelion three times before the last appearance. The period of the comet has been calculated to be 415.4 years. It ought therefore to have been visible in the years 1445, 1031, 615. Comets were observed in 1444, 1032, 617. It will be interesting to many readers of NATURE to know that these are identical. They were all observed in July or August, and were all seen to pass close to β Leonis. The following accounts of them have been given:—

A.D. 617 (i).—"In Ju'y a comet with a tail 3° or 4° long was seen near β Leonis."—(Ma-tuoan-lin.)

A.D. 1032.—"On July 15 an extraordinary star appeared in the north east. It approached β Leonis."—("Compendium Historiarum," 730.)

A.D. 1444.—"On August 6 a comet 10° long was seen to the east of β Leonis; it became longer day by day till August 15, when it entered the sidereal division of α Virginis."—(Biot.)

The longitude of β Leonis is 169°, its latitude 13° N. If the earth were to remain fixed in its position for July 15 it would see the comet 1861 I. pass through the point whose longitude is 169° 30', latitude 13° N. If the earth were in the position of August 6 the comet would pass through a point whose longitude is 177° and latitude 13°, or to the east of β Leonis, and moving towards α Virginis. Thus these four apparitions are the same comet; and the meteor-shower of April 20, hitherto considered to depend on the comet 1861 I., cannot be considered to agree in period.

GEORGE FORBES

Anderson's College, Glasgow, April 2

A Feat of Memory

THE following feat of memory seems to be worthy of record in your pages. It is new to the writer, though by no means uncommon over here.

Like the country itself, many institutions in the United States run to size in a way apt to astonish the dwellers in our "tight little island." So it is with hotels. Thus at some of them many hundreds of persons are simultaneously dining in one room. At the entrance, the hats, &c., of the guests are deposited with a person in attendance to receive them. He does not check or arrange them in any particular order, and he invariably restores them, each to the right owner, as they emerge from the dining-room. The difficulty of the feat naturally depends on the number of hats in charge at the same time. The most remarkable case which has come under the notice of the writer is at the Fifth Avenue Hotel, New York. There the attendant, who is on duty several hours a day, has sometimes as many as five hundred hats in his possession at one time. A majority of them belong to people whom he has never seen before, and there is a constant flux of persons in and out. Yet even a momentary hesitation in selecting the right hat rarely occurs. The performer at the above hotel says that he forms a mental picture of the owner's face inside his hat, and that on looking at any hat the wearer's face is instantly brought before his mind's eye. It would be interesting to test how far this power is possessed by an average unpractised person when put in the right way of doing it. While many of our ordinary recollections are not visual, at least not consciously so, it appears probable that most cases of extraordinary memory consist in an unusual power of making and retaining visualised impressions. Mr. Galton's interesting paper in NATURE (vol. xxi. p. 252) on "Visualised Numerals" goes a long way to show this to be so in mental arithmetic. Systems of artificial memory tend towards the same point; for they may be roughly described as mainly resting on the systematic

manufacture of artificial visualisations; and the hat feat just narrated falls within the same category.

In working the rich mine which Mr. Galton's genius has discovered, I hope he will explore the vein of chess without the chess-board. As efforts of memory, such performances are as surprising as the numerical feats of Colburn and Bidder. And they notably differ from them in that the highest development is reached, not by young boys, but by men of mature years, who, as players over the board, have reached the front rank. The writer (in last year's *Chess Player's Chronicle*) attempted to give a rough estimate of the number of moves and positions possible at chess. They are of course practically illimitable; and with this fact in mind it is easy to form an idea of the difficulty of playing twelve games blindfold against very strong antagonists. This task, however, is often performed by Messrs. Zukertort and Blackburne, beyond question in England, and probably in the world, the greatest adepts in this branch of chess-play. It would be highly instructive to learn by what process, in so far as it is a conscious and describable one, these feats are achieved. If Mr. Galton takes the matter up, no doubt he will, with his usual skill, throw a flood of light upon the subject.

EDWYN ANTHONY

Riggs's Hotel, Washington, March 29

Meteor

A LARGE and brilliant meteor was seen here at 8.25 p.m. on the 7th inst. It appeared a little below Zeta Tauri, and travelled very slowly southwards in a line nearly parallel to the horizon, traversing a space of about 50°.

The meteor rapidly increased in brilliancy, and is described as many times brighter than Venus, until near the end of its course, when it diminished in size. No trail was seen, although the meteor appeared to smoke.

SYD. EVERSHED

Wornerh, Guildford, April 12

Carnivorous Wasps

A SUMMER or two ago I observed a number of dead flies, blue-bottles, bumble-bees, and hive-bees on a certain part of one path in my garden; though the dead insects were removed every day, yet a fresh collection was seen every morning, the cause of death remaining unknown for several days. One morning I was earlier than usual in the garden, and I saw a number of wasps attacking flies and bees in their flight, biting and twisting their wings, and ultimately killing their victims on the ground.

The garden was at the time full of flowers, and the wasps appeared to be waiting in ambush for the flies and bees as they came over a low wall into the garden. Sometimes the wasps would bite the wings entirely off their victims, and they soon after appeared to be sucking the juices of the flies from the joint between the head and thorax.

WORTHINGTON G. SMITH

"Who are the Irish?"

WILL you permit a few words of reply to your notice of "Who are the Irish?"

Grateful to your critic for pointing out some hastily-written sentences, I am surprised he failed to see the real object of the little book. This was to show in a popular rather than a scientific way the folly of that *race hatred*, arising from the assumption that Irish are Celts and English are Saxons.

It was not necessary to cite French authorities on the Celtic question there, though they appear in the forthcoming pamphlet on "Who are the Scotch?" As for my supposed absurd remarks about Basques and Dark Irish, I only quoted the opinions of the learned Prof. Huxley. My simple and honest desire was to promote peace and goodwill between two peoples, more closely related than the factious and contentious care to believe.

JAMES BONWICK, AUTHOR OF
"WHO ARE THE IRISH"

Acton, E., March 24

A LEAF FROM THE HISTORY OF SWEDISH NATURAL SCIENCE¹

III.

IN a yet higher degree than fluor spar, phosphorus attracted attention through its property of being self-luminous in darkness in consequence of a slow combus-

¹ Translated from a paper by Prof. A. E. Nordenskjöld of Stockholm. Continued from p. 541.

tion. This substance was accidentally discovered, as I have already mentioned, at the close of the sixteenth century, at Hamburg in the course of experiments made by the ruined alchemist, Brandt, with a view to produce the philosopher's stone by the dry distillation of urine which had been evaporated to dryness. The raw material was not abundant, the process of manufacture uncertain, and phosphorus, which is now sold at about 7s. 6d. per kilogram, was worth many times its weight in gold. Soon after the physician Bernard Albinus discovered that the same substance could also be produced from the ashes of certain plants, but its general occurrence in nature (in the bones of animals and in the mineral kingdom) was first pointed out by Scheele and Gahn, who, during Scheele's stay in Stockholm (1768-70), are believed to have simultaneously made this important discovery.¹ It forms the proper starting point of our knowledge of this substance, of such extraordinary importance in the economy of nature, so indispensable in scientific agriculture, in medicine, and in numberless branches of modern industry.

In attempting to discover the cause of cold-shortness in iron, Bergman and the German Meyer believed that they had discovered almost simultaneously that it was caused by the iron being alloyed with a brittle and easily fusible metal, for which Meyer proposed the name *hydrosiderum*. Soon after, however, Meyer himself and Klaproth showed that a metal completely similar was produced by fusing together iron and phosphoric acid—the latter distinguished chemist expressly declaring that the analytical proof of this was difficult to carry out. The year after, however, Scheele succeeded in producing phosphorus in a very ingenious way from cold-short iron. We are thus under a great obligation to him for a very important contribution to scientific metallurgy.

As I have already stated, Brandt proved, about 1730, that the regulus of arsenic ought to be considered as a peculiar semi-metal, whose proper "kalk" was arsenious acid. If we except Macquer's discovery of arseniate of potash, our knowledge of this important and dangerous substance made little progress during the following decades, until Scheele in 1775 published in the *Transactions* of the Swedish Academy of Sciences his remarkable, and in this field epoch-making work "On Arsenic and its Acid." Scheele introduced to our knowledge arsenic acid and a number of its salts, and besides discovered that it gave with zinc a gas previously unknown, which contained "combustible air" and arsenic. This gas (arseniuretted hydrogen) is exceedingly poisonous, and experiments with it forty years after its discovery cost the German chemist Gehlen his life. It appears to be this gas which is given off in rooms where the paper-hangings contain arsenic. This work of Scheele's came to be of great theoretic importance by his sharp glance immediately noting that the white arsenic and the new arsenic acid were different degrees of oxidation, or as it was then expressed, different "stadia of dephlogistication" of the same metal. Long before Davy's discovery of potassium and sodium, Berzelius' of calcium and silicium, and Wöhler's of aluminium, Scheele appear to have had a clear insight into the relationship of the earths to metallic oxides.²

¹ The first account of this discovery is found in a note of two lines in Scheele's paper on fluor spar, to this effect: "That the earth in bone and horn is lime saturated with *acidum phosphori* is newly discovered." (*Trans. Acad. Sc. 1771*). The discovery was ascribed by Bergman in his edition of Scheele's Chemistry, at one place to Scheele, and at another to Gahn. The facts of the case are cleared up in Wilcke's biography of Scheele. He had in the spring of 1770 mentioned to Gahn that he had found in burned hartshorn lime combined with a substance unknown to him, on which Gahn examined the "animal earth by means of the blow-pipe, and found it to be composed of lime combined with phosphoric acid." Scheele at first doubted Gahn's statement, until in the summer of the same year at Upsala he for the first time made phosphorus from burned bones.

² All metallic "kalks," indeed all earths are distinct acids, whose difference depends on different proportions of phlogiston. In a letter to Hjelm Scheele says:—"The discovery of ferric acid is reserved for chemists, not earlier than the coming century, when we labour in the Elysian fields." Ferric acid was discovered in 1840 by Fremy.